

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



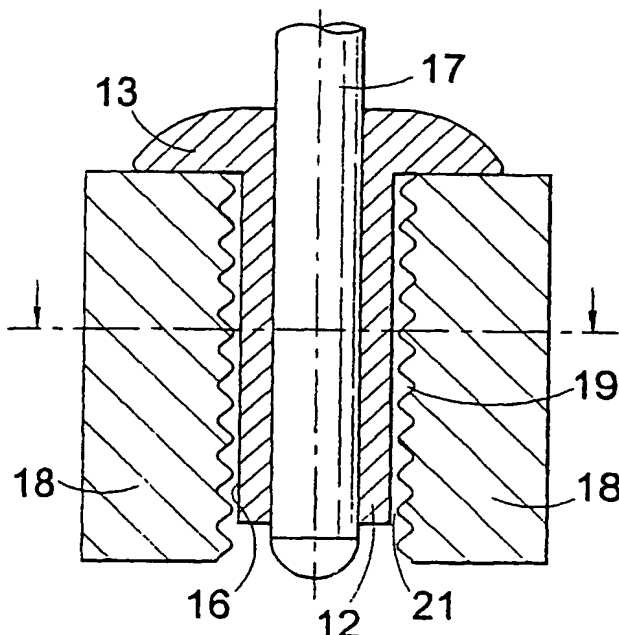
(43) International Publication Date
8 January 2004 (08.01.2004)

PCT

(10) International Publication Number
WO 2004/002652 A1

- (51) International Patent Classification⁷: B21K 1/60, B21C 37/20
- (21) International Application Number: PCT/GB2003/001619
- (22) International Filing Date: 15 April 2003 (15.04.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0214959.9 28 June 2002 (28.06.2002) GB
- (71) Applicant (for all designated States except US): TEX-TRON FASTENING SYSTEMS LIMITED [GB/GB]; Mundells, Wewlyn Garden City, Hertfordshire AL7 1EZ (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): CRUTCHLEY, Derek [GB/GB]; 1 Sandycroft Close, Locking Stumps, Warrington, Cheshire WA3 7LY (GB).
- (74) Agent: MACKENZIE, Andrew, Bryan; Sommerville & Rushton, 45 Grosvenor Road, St. Albans AL1 3AW (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SPLIT DIE FOR FORMING GROOVED WORKPIECES



(57) Abstract: A method of forming a radially expandable externally grooved tubular fastener from metal, comprising the steps of providing a suitable tubular blank (11) having a tubular wall (12) and squeezing the tubular wall between an internal member (17) with a surface which engages the internal tubular wall face (15) of the blank and a plurality of external members (18) provided with suitably shaped surfaces engaging the external tubular wall face (16) of the blank (11) thereby to form grooves (23) on the external tubular wall face (15) of the blank (11).

WO 2004/002652 A1